

INSTITUTO NACIONAL DE ESTADISTICA



# **Hospital Morbidity Survey. Methodology**

## 1. Background

The Hospital Morbidity Survey attended in hospitals is a statistical research that began in 1977, after the creation of a Working Group at the beginning of 1974, at the proposal of the INE. This Working Group was made up of representatives of the General Directorate of Health, the National Welfare Institute, the Central Commission for Hospital Coordination and the INE itself.

The meetings of this Working Group resulted in the Project for which this Survey has been developed since 1977. The objectives proposed for this Survey are the following:

To know the general morbidity attended in hospitals in the country according to the definitive or discharge diagnosis.

Determine the average hospital stay by type of diagnosis.

Serve as a basis for determining the scope of influence or attractiveness of hospitals.

Serve as a starting point for in-depth studies on specific diseases.

Since 1977, the fulfilment of these objectives was guaranteed with the implementation of two basic health documents such as the Patient Record Book and the Patient Record Card, which entailed a systematic registration of all patients admitted and discharged from the hospital.

Subsequently, as a consequence of the need for a good information system to facilitate the functioning of health systems and, specifically, to have a hospital information system adapted to the regional and functional reality of the National Health System, and comparable to that of other EU countries, the concept of the *Minimum Basic Data Set* (MBDS) for the patient's hospital discharge was developed.

This information system included a set of administrative and clinical data in a standardised manner for each contact made in care centres, which allowed us to know the morbidity attended in the different hospitals. It responded to the information needs of multiple users (management, planning, epidemiological research, clinical research, etc.) and provided clinical-care, demographic and administrative information, which served to support the health planning and management of those involved in the health system.

In 2015, a new health regulation was published creating the Register of Specialised Healthcare Activity based on the current Minimum Basic Data Set (RSHA-MBDS).

This new hospital information system, obtained from the patient's medical records, is of an administrative nature. It affects both public and private centres, and includes hospitalisation processes as well as all other types of healthcare modalities.

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### 1.1 Legal provisions

Royal Decree 1360/1976 of 21 May established the compulsory use in all hospitals in the country, both public and private, of a standardised Patient Record Book in which at least the following data had to be provided:

Admission order number, correlative for all patients.

Patient's medical record number.

Date and time of admission to the hospital.

Surname, first name, sex, date of birth, marital status and usual residence of the patient.

Reason for admission to hospital, specifying whether it is a medical order, personal request, family request, court or government order or other reason, and whether it was an emergency or an ordinary case.

Provisional or admission diagnosis.

Final or discharge diagnosis.

Date and reason of discharge, specifying if it is due to cure or improvement, transfer to another centre, death or other reason.

Discharge order number.

It was also established that the information provided in the Book is confidential, establishing that the competent authorities may have access to it only for statistical or study purposes, while maintaining the absolute anonymity of the persons included in it.

This Royal Decree entered into force on 1 January 1977.

Subsequently, the Order of 14 November 1977 of the Ministry of Defence made the use of the Register mandatory in military hospitals, thereby extending its scope to all hospitals in the country.

The basic element for the completion of the Record Book was the *Patient Record Card*, which consists of two parts. Part A, which is completed by the Hospital Admission Service, and part B, in which the Clinical or Medical Service that gives the patient the final discharge must complete the data corresponding to said discharge (definitive diagnosis, date, reason) and which must be returned to the Admission Service when the patient is discharged.

Once this information has been transcribed into the Record Book, part A of the card is separated and filed by discharge order, and part B is used to complete the patient's clinical documentation.

The Record Book is still used in certain (private) hospitals, but the need for instruments that allow management control in hospitals has influenced the adaptation of the existing information systems to the new situation, incorporating concepts and tools that allow continuous improvement in the quality and homogeneity of these systems.

In 1975, the Committee for Scientific and Technological Information and Documentation of the European Communities set up a Working Group made up of experts and representatives of the different countries to learn about the hospital information systems existing in the centres.

In this way, different data (administrative and clinical) were selected that could be obtained from the medical records.

In 1981, the report *Minimum Basic Data Set for Hospital Statistics in the European Communities* (MBDS-E) was presented, developed by different experts in health information systems and statistics from different countries, including Spain.

The MBDS was supported by the European Commission, WHO-Europe, the Hospital Committee of the European Commission and the International Association for Medical Informatics, and subsequently included by the Council of Europe as an integral part of the hospital information system.

In Spain, on 14 December 1987, the Interterritorial Council of the Ministry of Health and Consumption approved the establishment of a Minimum Basic Data Set (MBCD) for hospi-

tal discharge, in accordance with those accepted both by the National Committee for Vital and Health Statistics of the United States and by the Commission of the European Communities on the minimum basic data set for Europe.

The first Autonomous Community to establish the MBCD was Cataluña by Order of 23 November 1990, requiring its completion by both public and private hospitals. The next institution to make the MBCD compulsory for its own and administered hospitals was the National Institute of Health (INSALUD), by Resolution of the General Secretariat of the National Health System of 24 January 1992.

Afterwards, the Ministry of Health and Consumption, in collaboration with the Autonomous Communities with transferred health management and INSALUD, agreed at a meeting on 22 April 1992 to create a Steering Committee for the Development of the MBCD within the National Health System. With the development of this project, the rest of the Autonomous Communities were publishing decrees or resolutions to implement this information system (C. Valenciana, País Vasco, Galicia, Andalucía, Navarra, Canarias, Madrid, Murcia, Castilla-La Mancha, Castilla y León, Aragón, etc.).

The obligation to prepare a report of hospital discharge of the patient that must comply with the Minimum Basic Set of Data is established by Order of the Ministry of Health and Consumption of 6 September 1984.

The development of the hospital information system (administrative and clinical) based on the MBCD has made it possible to obtain homogeneous information from the different hospitals and administrations to the same extent as previously guaranteed by the Patient Record Book.

In 2015, the Ministry of Health, Social Services and Equality published the R.D. 69/2015, of 6 February, which regulates the Register of Specialised Health Care Activities in order to cover the demand for information allowing for proper planning and evaluation of health services. All the Autonomous Communities and Cities have been consulted for its implementation. All this together with the use of a new classification for the main diagnosis of the disease, the International

Classification of Diseases 10th revision, clinical modification for diagnoses (ICD-10 - diagnoses).

A minority of hospitals continue to use the standardised Patient Record Book, regulated by Royal Decree 1360/1976 of 21 May, the use of which was compulsory for both public and private hospitals.

The confidentiality of the data collected at the time of the patient's hospital discharge, both by the RSHA-MBDS system and by means of the Record Book, is guaranteed when it is established in the respective regulations that the competent authorities may only have access to said data for statistical or study purposes, maintaining in all cases the confidential nature of the information recorded and the anonymity of the persons concerned.

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## 2. Objectives of the survey

The objectives of these statistics are as follows:

1. To ascertain the general morbidity attended in hospitals according to the main diagnosis through the number of discharges.
2. To determine the average hospital stay based on the main diagnosis associated with hospital discharge.
3. To serve as a basis for epidemiological studies on certain diagnoses.
4. To determine the geographical distribution of morbidity attended in hospitals, based on the province of hospitalization of the patient and the province of residence.
5. To provide a standardised information base for all the country's hospitals, both public and private, based on selected variables.
6. To serve as a basis for national and international comparative studies.

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## 3. Variables: definitions and concepts

The **target variables** are: Number of hospital discharges and length of hospital stay.

Hospital discharge is defined as the procedure by which a patient admitted to a health centre or establishment ceases to occupy a hospital bed due to cure, improvement, death, transfer or voluntary discharge.

For the purposes of the survey, a patient is considered to be any person who has been admitted to a hospital to be attended, diagnosed or observed as an inpatient and has been discharged from a hospital.

The stay is defined as the date of discharge minus the date of admission, not counting stays equal to zero days.

The **classification variables** used are: main diagnosis, type of hospital admission, reason for discharge and province of hospitalization. With respect to patients, age, sex and place of residence are recorded.

The place of residence is considered to be the usual place of residence of the patient and is identified by the numeric code of the province.

The province of hospitalization is identified by the provincial digits corresponding to the hospital identification.

The main diagnosis is defined as the condition which, after the necessary study, is established as the cause of admission to the hospital according to the criteria of the clinical service or physician who attended the patient, even though important complications and even other independent conditions may have appeared during the patient's stay. This definition is established in the Order of the Ministry of Health and Consumption of 06/09/1984. The classification used until 2015 was the International Classification of Diseases 9th revision, clinical modification (ICD9 CM). From 2016 onwards the International Classification of Diseases 10th revision, clinical modification for diagnoses (ICD10 - diagnoses) is used.

Until 1991, both the marital status of the patient and whether the admission was considered a new case or an old case were included as variables, but with the changes in the hospital information systems they experienced a high lack of response, so that from that year onwards they were no longer published in the tables of the Survey. The reason for admission (medical order, personal request, etc.) is

no longer published as of 1998 for the same reason.

Since 2011, disaggregated data are published identifying whether the discharge has been carried out in a public or private hospital according to the classification of functional dependency published in the National Hospital Catalogue. This classification is determined by the body or legal entity on which the hospital depends, that is, the natural or legal person who exercises dominion or jurisdiction, hierarchical or functional, most immediately over the health establishment. The classification of functional dependency of hospitals with legal forms of management contemplated in Law 15/1997, of 25 April, on the authorisation of new forms of management in the National Health System, and in accordance with legislative developments in the Autonomous Communities, has been assigned to that of the corresponding Health Services.

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#### 4. Areas of the survey

**Territorial scope:** The scope of the survey is national, that is to say, it covers all hospitals established in the national territory, including both public and private hospitals, as well as military hospitals, given the large number of civilian personnel who are treated there.

For the purposes of this survey, a hospital is considered to be any health centre which, regardless of its name, has as its main purpose the provision of medical, surgical or medical-surgical assistance to the patients admitted therein.

Therefore, this does not include nursing homes, orphanages, nursery schools, foster homes, psycho-pedagogical re-education institutions, etc., as they do not comply with the proposed definition.

**Temporal scope:** Hospital discharges that have taken place during the reference year of the survey are considered, regardless of the date of admission.

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#### 5. Information collection

Most hospitals have mechanised information on discharges, either based on the RSHA-MBDS system or the Record Book. For these

hospitals, the INE agents collect the necessary information for the HMS on magnetic media on the basis of established characteristics and registration designs. However, in a large number of hospitals, in order to make better use of the available resources and not to overburden the reporting hospital unnecessarily, the INE collects the HMS information in the same format as that used by the hospital, and then transforms it into its own design.

For that minority of hospitals that do not have mechanised information, the data are collected manually in questionnaires. This questionnaire is filled in directly from the data contained in the Patient Record Book and the associated Patient Record Card that some hospitals continue to use.

The manual collection of the information is carried out by INE agents through visits to hospitals and the frequency of the visit depends for the most part on the planning of the work of the agents, since most hospitals are computerised and the load involved in this collection is minimal.

On 8 June 2004, a Collaboration Agreement was signed between the National Institute of Statistics and the Department of Health and Social Security of the Government of Catalonia by which the latter, through the Catalan Health Service, sends the INE on magnetic support (through its Provincial Delegations) the information corresponding to the MBDS database of the public and military hospitals included in its territorial scope, and that of those private hospitals for which information is available in said database.

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#### 6. Processing of the information

Once the input files containing the primary data corresponding to the information from each hospital are received, a first validation of the information and a series of controls are carried out to ensure that the different files exceed the minimum quality level required for further processing.

The first part of the computer processing is carried out in batches, grouping together a certain set of files for common processing. At the beginning of the computer process, a differentiation is made between the set of

files that already come with the coded disease diagnosis and a second group formed by the files in which only the literal of the disease is detailed and that must therefore be subject to a coding prior to their subsequent computer processing.

The assignment of codes to the disease literals is performed in two stages. First, an automatic coding is carried out of those literals that have been found in the dictionaries which have been implemented as help support in the software. On the other hand, in those literals in which the search and localization process has not been effective, a manual coding is carried out by specialized personnel who can also, if necessary, consult the doubts with expert medical personnel.

Once the batch processing of the different files is finished, the complete survey file is generated from the union of the different batches and the second part of the computer processing begins, which consists of different phases.

First, a check is carried out on any duplicates that may be detected in the file and that may be erroneously added, either because they have been included in more than one of the exchange files or because of duplicity of origin generated during the hospital information management process itself.

Next, the derived variables of age and stay (in days) are calculated and a review and validation of specific groups of records associated with certain groups of diseases and long term stays is carried out.

The detection and imputation of incompatibilities between variables and the cleaning of invalid values is carried out using the ADI software (Automatic Detection and Imputation), a generalised editing and imputation system developed by the INE and widely applied in different surveys.

ADI is based on the cleaning and imputation methodology of Fellegi & Holt and on an associated mathematical model that guarantees compliance with the basic principles of the system: a) Principle of minimum change: All errors (edits) in the records must be deleted modifying as few fields as possible. b) The imputation is carried out automatically by the system itself based on the previously established editing rules. c) The automatic

imputation should maintain, as far as possible, the marginal frequency distributions (and even preferably the joint distributions) of the different variables corresponding to the error-free records.

The definition of specifications for ADI has taken into account the criteria established for the validation of ICD-10 codes which are based on the coding guidelines created by the Centres for Medicare and Medicaid Services (CMS) and the National Centre for Health Statistics (NCHS), organisations belonging to the U.S. Federal Government. These recommendations have been reviewed in those diagnoses of the Tabular List of Diseases on which there were doubts or which have been the subject of debate and discussion in the communications between experts from the different Autonomous Communities. On the other hand, revisions and adaptations of the original materials have also been carried out over time, which has led to the incorporation of modifications in the established criteria, allowing them to be refined and improved.

Once the DIA phase has been implemented and analysed, the processing of the survey concludes with the calculation of the adjustment factors that make it possible to correct the “non-response” and to obtain tabulations for quality control, an instrument that would allow, where appropriate, the detection at the macro level of any possible errors that had not been corrected in previous phases. After this last revision, the tables of results corresponding to the dissemination of the survey are generated, as well as the corresponding anonymous data files that will be made available to users on the web.

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## **7. 6. Dissemination of the results**

The dissemination of the survey results is carried out through three main channels: the publication of the results tables on the INE website, the provision of the microdata files of the survey to interested users and, finally, the possibility of making requests for information tailored to the specific needs of each user.

With regard to the publication of the results available on the website, the tabulation plan

of the survey has been structured into two main blocks of information, differentiated according to the geographical area of reference.

First, the "National Results" are presented, a set of tables that reflect the main results of the survey obtained at the national level. The second section includes the "Results by Provinces, Autonomous Communities and Cities", tables that provide the survey data broken down by territory, both at the Autonomous Community level (and within each Autonomous Community) and including the corresponding provincial breakdown.

From an analytical point of view, the main variables for which information is provided in the tables of the survey are the number of hospital discharges that have taken place in the different hospital centres during the reference year, the total stays (in number of days) and the average stay associated with the different hospitalisations, the average age of patients admitted and the hospital morbidity rates that allow us to assess the number of patients admitted and discharged in relation to the total population.

The main classification variable reflected in the tables is the main diagnosis of the disease for which the patient was admitted to the corresponding hospital. The coding of the diagnoses has been carried out from 2016 according to the International Classification of Diseases version 10 Clinical Modification (ICD10-CM), and the breakdown of the diagnoses offered takes as a reference the "International Shortlist for Hospital Morbidity Tabulation (ISHMT)" which has been established at international level and adopted by the Statistical Office of the European Communities (Eurostat) to disseminate results and carry out information exchanges, which will facilitate comparability with other countries of the European Union. Until the reference year 2015, the tables of the survey were presented according to the previous Classification of Diseases (ICD-9 CM).

Other classification variables that are shown in the tables, apart from the main diagnosis, are sex and age (age group) of the patient, the reason and urgency for admission, the dependence of the hospital and the reason for discharge.

In addition to the dissemination of the tables of results, potential users interested in analysing the survey data in more detail and depth can download the microdata files that are available on the INE website. These files have been previously anonymised in order to maintain confidentiality and statistical secrecy. Together with the files themselves, the record designs are also provided, as well as additional information on the correspondence between lists and classifications of diseases.

Finally, there is also the possibility of making custom information requests and carrying out statistical exploitation of the survey results, adjusted in each case to the detail and specific needs of each user.

All this constitutes a complete plan for the dissemination of the results through different platforms, which provides the different users with a wide range of information and a high degree of detail in order to meet the main information demands of the survey.